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ORIGINAL ARTICLES.

DISCUSSION.

OF THE PAPERS BY DRS. MOORE AND BULSON.

DR. BRIGGS:—I have always called such cases as Dr. Moore describes hysterical amblyopias. I have usually seen them in school girls in debilitated condition from over study, and too little out-of-door exercise. In regard to the case spoken of by Dr. Bulson, I am very glad to hear the report, because it opens a new field. We have certainly overlooked a great many cases in the past. There are so many poisons taken into the human system as beverages or in some other form, alcohol, tobacco, coffee, and tea, that produce various nervous disturbances, and the nervous affections of the eye, I believe, are not infrequently produced by strong coffee and I have no doubt that coffee, even in small quantities, will have a more or less debilitating effect on the nervous system. I saw a patient last winter some time who had during the evening that he was engaged in writing a paper, taken three cups of very strong black coffee, and in the night some time was taken with total deafness in his left ear and loss of power of locomotion. Whether the coffee had anything to do with the affection of the semi-circular canals is a question in my mind, but I have considerable leaning to the view that it may have precipitated the attack.

DUDLEY S. REYNOLDS: I think it was at the Cincinnati meeting of this Academy the subject of hysterical amblyopia was discussed, and I reported some cases occurring in my own practice which seemed to me were due to auto-intoxica-

tion, and I have since then had the opportunity of seeing a very strikingly illustrative case. I would like to suggest to Dr. Moore that he add the bitartrate of potassium to the pilocarpine treatment, and he will find more rapid recovery. I have lost confidence in the medical treatment of hysterical amblyopias engineered by disturbance of the genito-urinary apparatus in women. As to the effects of coffee I have reported several cases, and one striking case I have alluded to a number of times, and beg pardon for referring to it again. A lady about 42 years old, became gradually more and more amblyopic; the retinal arteries became contracted, the discs pale and the veins injected and at times tortuous. There were, also, ataxic symptoms and locomotion without a cane was finally impossible, and she gradually became so nervous as to take to her bed where she remained four or five years, refusing to give up coffee, and finally died with just enough light perception to enable her to distinguish large bodies, or the shadows of people walking through the room.

J. J. KYLE, Indianapolis, Ind.: I believe we have a great many cases of anaesthesia of the retina not dependent upon systematic conditions, diseases, neurasthenia, etc. I have had cases under observation, especially in women who suffered from painful affections of the eyes, which reacted quickly on the local application of electricity the negative pole to the eye and the positive pole to the neck. These were typical cases of amblyopia, not dependent on systematic conditions, and I think, as Dr. Moore says, we must differentiate between the different anaesthesias, as it were, of the retina.

GEO. F. SUKER: The term hysteria, in its broad sense, is a misnomer. It is hardly consistent with our conception of things to have a functional disturbance without some organic change somewhere. The idea of idiopathic disease is being rapidly eliminated from our category. With reference to the contracted field, as spoken of by Dr. Moore, I think the gun barrel vision described by Graefe of Berlin, corresponds to Dr. Moore's case. I think there are cases where you can have a concentric contraction for form and color (without inversion) and yet the acuity be reduced. I think that the field of hysterical amblyopia needs further investigation than we have given it up to the present day.

In regard to Dr. Bulson's paper, kindly pardon a personal allusion; I am a confirmed drinker of strong coffee, and can vouch for the fact coffee does often produce an amblyopia. When I drink it to excess, a good, strong cigar has the same effect upon me that Dr. Bulson sets forth in his paper.

Dr. Moore (closing): I have very little to say, except as I understand it the usual hysterical field for red is increased or normal, whilst that for white is contracted. In my cases the fields for both colors were contracted proportionately with the visual acuity, retaining their normal relationship. This was also true of the cases reported by Fox, all of which yielded to the galvanic current.

Dr. Bulson (closing): I regret that the cases of coffee amblyopia reported by Dr. Reynolds did not come to my notice. I found in the literature at my command but little reference to the subject of coffee amblyopia, and what I did find was meager and devoid of particulars. Had I found any reference to Dr. Reynolds' cases I certainly would have mentioned the fact in my paper.

We are beginning to recognize certain toxic amblyopias which formerly escaped our attention, and I believe we will eventually distinguish coffee amblyopia as one of the relatively common amblyopias, even though the alteration in the state of the vision in the majority of such cases is slight. The two cases observed by me did not bring out any specific symptomatology other than the amblyopia and the contraction of the fields of vision. It is likely, however, that eventually we will have a series of manifestations which definitely point to coffee as being the cause of the trouble, just as we recognize by certain manifestations the amblyopia from tobacco, hysteria, etc. In one of my cases the diagnosis was made largely by exclusion, and in the other the diagnosis by exclusion was strengthened by the recurrence of the amblyopia when the use of coffee was resumed.

In experimenting upon myself I took advantage of a long recognized sensitiveness to the effects of strong coffee. For several years I have not been able to drink coffee at the evening meal without suffering from wakefulness during the early part of the night. The production of visual disturbanc seemed possible, and with that end in view the experiment

was undertaken. No doubt the amblyopia produced would have been more pronounced had the use of coffee in large quantities been longer continued, but the resulting nervousness and gastro-intestinal disturbance was so annoying that I felt compelled to abandon the test. A very appreciable contraction of the visual fields and slight amblyopia was demonstrated before the conclusion of the test.

Dr. Reynolds speaks of congestion of the retinal veins and contraction of the arteries in the cases reported by him. I was not able to distinguish any features of this kind in either of my cases. The only variation in the appearance of the fundus noted was a slight pallor of the temporal half of the disc and faint haziness of the border of the disc. One of my confrères who made an ophthalmoscopic examination of my eyes during the heighth of the coffee toxæmia said that aside from a slight pallor of the temporal half of each disc there was a faint haziness over the entire retina of each eye, most pronounced at the margins of the discs. The haziness entirely disappeared following abandonment of the use of coffee.

THE USE OF PURE NITRIC ACID IN THE TREATMENT OF DISEASES OF THE EYE, ETC.*

DR. J. W. BULLARD,

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I began the study of medicine in the office of my father who was an Eclectic, and in his library was a "Manual of Eye Surgery," by A. J. Howe, A.M. M.D., Prof. of Surgery in the Eclectic Medical Institute of Cincinnati, Ohio. In the chapters on Pterygium, Keratitis and Ulceration of the Cornea, the author speaks of the use of pure nitric acid in the treatment of these affections. It was here that I first re-

*Read at the Meeting of Amer. Acad. of Ophth. and Oto Laryng., Aug. 26, 1904.

ceived my inspiration in the use of nitric acid in the treatment of certain diseases of the eye.

In the discussion of Dr. Kipp's paper at the Saratoga meeting of the American Medical Association, when Serpiginous Ulceration of the Cornea was under consideration, Dr. Edward Jackson spoke of using it in 20 to 50 per cent. solution; Prof. Haab, who was present, spoke of using it pure, and Dr. R. L. Randolph, who followed Prof. Haab, also mentioned the "pure acid," but whether he referred to both nitric and carbolic or only carbolic, I am unable to say. In a paper read by the author before the Gage Co., Nebraska, Medical Society and published in the Western Medical Review, on "Ulcers of the Cornea," its utility was incidentally mentioned. The author was present at the meeting of the Baltimore Medical and Surgical Society, in April 1902, when Dr. Theobald read a paper on the treatment of ulcers of the cornea with carbolic acid, and took part in the discussion, when he also advocated the use of pure nitric acid. Aside from these I do not know of any public mention having ever been made of the use of pure nitric acid in eye surgery.

Nitric acid is one of the most powerful escharotics in the mineral acid group, but as it coagulates the albumen of the tissues without redissolving it, it in this way safeguards its own excessive action. (Potter). It has always been recommended in phagedenic conditions in structures other than those of the eye. In eye surgery its action can be controlled to a nicety and in the great majority of cases is just as effectual as is the action of the actual cautery, possessing all the advantages of the latter and none of its disadvantages. You cannot, however, as is necessary in some serious cases of deep infected ulcers of the cornea with accompanying hypopyon, do a paracentesis with it as can be done with the cautery; neither can large masses of tissue be destroyed by it, but in the ordinary infected ulcers of the cornea, it will do all that the cautery will do, and with less inconvenience to both surgeon and patient. It is a very difficult matter to get some patients to be absolutely quiet while you are using the cautery, as they not only see the red hot electrode, but feel the heat. The acid is always handy, requires no apparatus, and does not fail you at the critical moment as is sometimes the case with

the cautery. The action is deeper than that of carbolic acid, but not too much so if used with proper care. It possesses the advantage over iodine, that it forms a zone of coagulated tissue around the ulcer, thus closing the lymph spaces which produces a barrier against the further invasion of the healthy tissues by the ever-present microorganisms. In short, it may be used in any condition of the eye in which a cauterant is needed, as it is sure destruction to all forms of germs, thus checking the onward march of the spreading ulcerative process which is dependent on the action of microorganisms.

The mode of application is as follows: a small piece of pine, I usually use the non-combustible end of a match-stick, is whittled to a blunt, not a sharp point, and dipped into the acid and held till all moisture has disappeared. There will still remain enough of the acid for use. The eye, which has been previously cleansed and cocainized, is held open by the thumb and index finger of the left hand, and the ulcer either wiped dry with a probe wrapped with sterile cotton, or if there is much debris, curetted, when with the acid stick the floor and edges of the ulcer are touched. It is important that the ulcer be dry, or at least, comparatively so. The application coagulates the tissues with which it comes in contact, causing them to turn white, thus it is an easy matter to watch the extent of the cauterization. In phlyctenular conjunctivitis I almost invariably touch the individual phlyctenules with the acid stick, and with the happiest results; one application usually being all that is necessary to terminate the attack. This does not interfere with the constitutional and local treatment which is usually necessary to carry out to prevent recurrence.

In operating for pterygium it is not always possible to remove all the growth from the cornea. The essayist is usually in the habit of touching this residual portion with the acid pencil thereby hastening the absorption. It sometimes happens after a pterygium operation that there are some loops of vessels thrown across onto the border of the cornea and the growth reforms. In this case, if the acid stick is drawn across the bundle of vessels, just before it reaches the cornea, and this process is repeated at intervals of four or five days, the blood supply is cut off and the growth disappears. In old

vascular conditions of the cornea the vessels may be obliterated in the same way.

In cases of fascicular ulcer of the cornea, and in fact in every and all conditions of either cornea or conjunctiva where a cauterant is needed it is the ideal remedy.

For the past twenty years the author has used the acid almost exclusively, very rarely resorting to the cautery, and with such success that I thought it advisable to present the matter before this body. I feel sure if any of my confrères will use it as I have outlined, they, too, will be delighted with its action.

DISCUSSION.

Dudley S. Reynolds: I will call attention to the fact that the late Mr. Dixon of London, mentioned the use of fuming nitric acid in certain conditions, including granulated lids, which included trachoma and conjunctivitis. Mr. Dixon's plan was to shave off with a razor the hypertrophied papillæ, and apply the fuming nitric acid with a glass brush. In the Holmes' System of Surgery I think some mention of it will be found. I am sure Sir William Lawrence used dilute nitric acid in the treatment of purulent ophthalmia, mention of this practice may be frequently found in the literature of seventy-five years ago.

Geo. F. Suker: In the application of the nitric acid, especially of the fuming variety, it is important not to touch the healthy cornea. It is a good policy to instill olive oil in the eye and then wipe off the area to be touched, thus avoiding injury to the healthy cornea.

J. A. Donovan: The doctor speaks of nitric acid as doing nearly all the electric cautery will do. Since reading a paper before this society a year ago, I have used the cautery something like a hundred times. I have in three instances been obliged to use it the second time. I never had to repeat it more than the third time in any case. I can use the electric cautery in my office in less time than I could arrange this nitric acid, and feel safer. About the last fifty times, I used it at barely red heat. The black heat, just before the point of red, is safer, and as safe as anything possibly could be that

is efficient, and it also eliminates the feeling of heat in the cornea. Another thing, the nitric acid touches the floor of the ulcer, already deeper than you want, and of necessity makes it deeper; the cautery is used only at the edge. I consider the electric cautery the best method we have for treating ulcers.

J. A. L. BRADFIELD: I am an enthusiast for pure nitric acid and have been for the past ten years, and I most radically differ from what has just been said. Corneal ulcers can be treated with the least possible loss of tissue with nitric acid. An application can be made to the diseased portion and limited to that. It seems that many do not understand the use of the acid. Some, in using nitric acid as suggested by Dr. Reynolds, will get into serious trouble. The nitric acid is so powerful that we must be absolutely certain of what we are going to do. I use a hard tooth-pick instead of a match. By making the point to correspond with what you want to touch I have no trouble in getting exactly the effect desired and no more. Never let it be used until dried in the atmosphere.

A. ALT: I would like to ask Dr. Bullard whether he would use the nitric acid also in beginning epithelial cancer on the conjunctival limbus.

W. L. DAYTON, Lincoln, Neb.: I believe if the stick with which the nitric acid is to be applied is properly prepared there is no danger as pointed out by Dr. Suker. Wait until the moisture has gone and then prepare the stick, which should be cut off squarely at the bottom and not rounded or pointed. Dr. Bullard undoubtedly believes thoroughly in the use of nitric acid, as he requested me to apply it when I operated for him a few years ago. Since then I have used it a number of times on indolent ulcers. Where for any reason you do not care to use the cautery, nitric acid is a very excellent substance.

DR. BULLARD (closing discussion): In answer to Dr. Suker, I will say that I have never had to take any precautions against injuries from allowing the fumes of the acid to coming in contact with the cornea. Of course I allow the stick to become thoroughly dry before using it. I am glad to know that many of the members are using nitric acid. I am sorry

that some of the literature on the subject has escaped me, tho I looked it up pretty thoroughly as far as I had time. Dr. Donovan speaks of destroying more tissue by touching the bottom of the ulcer. I have never had any scar except where the tissue had been destroyed to such a depth already that scar tissue was inevitable, and besides I prefer to run the risk of destroying a little more tissue rather than allow the destructive process to cause peoforation of the cornea. In answer to Dr. Alt, who asks if I would use the acid in epitheliomata of the conjunctiva, while I have had no experience along this line yet I should not hesitate to do so, and I believe with good results. Dr. Dayton says I have the courage of my convictions. He operated on my right eye for pterygium, and I requested him to make the application on the cornea, and my pterygium, which was a bad one, has never troubled me since. I have been enthusiastic in the use of the acid. I cannot conceive the idea of getting sufficient heat in the electrode to cauterize the ulcer and the patient not feel the heat, if not on the cornea then on the lids. It may be that I have not used the cautery enough to be experienced, but I have been so thoroughly satisfied with the acid that I have not thought it necessary.

FURTHER EXPERIENCE AND TREATMENT OF KERATOCONUS.*

J. A. L. Bradfield, M. D.

LA CROSSE, WIS.

Keratoconus as a disease which has advanced till a well-formed cone is present, is very rare. If the atonic condition of the cornea which allows that membrane to lose its normal curvature irregularly, which is always the condition in the early development of the cone is called keratoconus, then keratoconus is a fairly frequent disease.

*Read at the Meeting of Amer. Acad. of Ophth. and Oto-Laryng., Aug. 26, 1904.

Observation convinces me the latter proposition is true. The most important aetiological factor is a fault in the general nutrition; secondary, eye strain (as over-use), bad light, unsteady position and errors of refraction. When the softened cornea gives way the resulting irregular astigmatism causes eye strain, which greatly hastens the progress of the disease.

The fault in the general system is often one which is self-correcting. Should this occur in the early stages of the disease we have only the slight ectasia as a mark of its existence. While if the cornea has proper attention at this stage no evidence whatever may remain. Should the disease continue until the area of affected cornea protrudes, a well-formed cone exists and a corresponding thinning of the apex takes place, only palliation is possible and good vision never restored.

Incipient keratoconus is always accompanied by failing vision and usually by asthenopia. When increasing myopic astigmatism is found with a variation of the axes with the principal meridians not at right angles, a positive diagnosis of keratoconus may be made.

Were the name kerato-atonia substituted for keratoconus the disease would much oftener be diagnosed at the stage where cure is possible.

TREATMENT.

Correction of any fault in the general system, rest of the eyes, correction of errors of refraction, before the ectasia has advanced until the cornea has become thinned, local application of the sulphate of alum to the diseased cornea. When a well-formed cone is present, cauterization of the apex of the cone with broad, low heated galvanic electrode, with subsequent iridectomy for visual purposes. Myotics and iridectomies as practised for glaucoma are valuable before the cone has advanced till it markedly protrudes.

To illustrate what may be done at the different stages of the disease, I report the following cases:

Case 1. Mrs. F., age 36, married, neurasthenic. Vision failing several years and eyes sō irritable as to be unable to use them for a year. Two month ago left became very pain-

ful, congested and almost blind. Right eye sympathised to such an extent as to be unable to see to get about alone. Examination revealed well-developed cone on right eye and marked cone with ulceration of the apex in the left eye. Patient was put on tonics and nerve sedatives. Ulcerating apex of left thoroughly cauterized perforating the membrane. But little reaction and pain greatly lessened. Compress bandage kept on three weeks when wound was well healed and cone greatly reduced in size. Two months later made iridectomy in each eye, section reaching to the periphery, after which the eyes became quiet and revealing vision O. D. V 20/200; 20/120 W. + 3.00 ⌒ — 8.00. ax. 75. O. S. V = Counting fingers ten feet, improved by minus lens. After a year she reports eyes feeling much better and able to do all ordinary house duties.

Case 2. Mr. C., aged 19, stenographer. Seen first June 23, 1901. Appearance of general health good but had been rachitic when younger. For last year eyes had been irritable and vision failing for distance. Ophthalmometer showed 1 1/2 D. ax. 55 or 150 in right eye and 1 D. ax. 45 with slight irregularity in left. O. D. V = 20/80 : 20/25 W — 1.50 ⌒ — 1.50 ax. 50. S. V. = 20/60; 20/15 — W— 1.00 ⌒ — .75 ax. 0.

Diagnosis.—Kerotoconus and advised glasses, change of work and treatment.

Aug. 18th, 1901, the following conditions present: O. D. V = 20/60; 26/25 W. — 50 ⌒ — 100 ax. 90. O. S. V = 20/25; 20/80 — W. — 1.00 ⌒ — .75 x 90 which was prescribed. Referred to family physician for general care and work changed to shipping clerk. Began treatment of cornea by local application of crystals of alum sulphate three times a week, which was continued till Feb. 8th, 1902, when ophthalmometry showed 1 1/2 D. ax. 60 in right, and 1 1/2 D. ax. 60 or 160 in left eye. O. D. V = 20/60; 20/25 W — 1.50 ax. 120. O. S. V. = 20/40; 20/25 W — 125 ax. 0, which correction was prescribed. Local treatment continued till July 5th, 1902, but less frequent, when ophthalmometry showed O. D. 2 1/2 D. ax. 45 and O. S. 1 1/4 ax. 135. O. D. V. = 20/60; 20/25 W. — 75 ⌒ — 2.00 ax. 100. O. S. V; = 20/60; 20/20 W. — .75 accepting C. X. O. Dec. 7, 1902. Ophthalmometry O. D. 4 D ax. 140, O. S. 2 1/2 ax. 140 O. D. V =

20/120; 20/40 W. — S. ⌒ — 2.50 ax. .75. O. S. V = 20/25 AC + 50.

Alum again used quite regularly, also eserine in right eye till May 25th, 1903, when ophthalmometry showed O. D. 6 D, ax. 50 or 145, O. D. V = 20/00; 20/60 W. + 4.00 ⌒ 6.00 ax. 80. O. S. V = 20/25 AC + 1.00. Patient's work now called him from the city. Prescribed eserine in right eye and collyrium of four per cent. alum sulph. in each eye three times a day. May 29th, 1904, he returned with the following conditions: Slight cone of right cornea. O. D. V = 20/200; 20/80 W. — 8.00 ⌒ — 5.00 ax. 55. O. S. V = 20/25 AC + 1.50. For last few months the error of refraction has not been corrected in the right eye. He is doing a good deal of writing and bookkeeping and the eyes are very comfortable. I believe an iridectomy should have been made in the right eye when the myopia began to develope but was positively refused. Cauterization will probably be necessary in a few months.

Case 3. March 30, 1902, Mr. B., mail clerk, aged 35. Vision of right eye very poor and left iritable on use. Slight cilliary and conjunctival irritation. Ophthalmometry showed O. D. 1 D. ax. 90 or 165. O. S. 1 D. ax. 25 or 105. O. D. V = 20/60; 20/20 W + 25 ⌒ — 1.50 ax. 0. O. S. V = 20/25; 20/20 W. + 25 ⌒ — .75 ax. 105, which was prescribed, and diagnosis of keratoconus made.

April 22, 1903, ophthalmometry showed O.D. V — 20/60; 20/20 W. + .75 ⌒ — 2.00 ax. 0. O. S. V = 20/20; 20/15 W. + .75 ⌒ — 100 x 125. Correction given and alum sulph. applications made twice a week till Aug. 14, 1903, when O. D. V = 20/60, 20/25 — W. + 1.25 ⌒ = 125 x 0. O. S. V = 20/15 — AC + 25. Eyes feeling well and works with perfect comfort. Aug., '04, refractions practically the same and eyes perfectly comfortable.

Case 4. Feb. 9, 1899, Mrs. D., consulted me for asthenopia; when found following conditions: External muscles and corneae normal, O. D. V = 20/25; 20/20 W. + 1.00 in each eye. Presbyopia + 1.75. Sept. '02, saw her again when vision and refraction were same but requiring + 2.50 D. for reading. During last few years had good deal of sickness in family and kept very tired all the time. April 1,

1904, called on me with following history: Lost husband a year ago and since very nervous. Last Jan. had grippe; eyes became congested, painful and vision poor. Was treated for conjunctivitis till consulting another doctor who recognised something more serious and sent her to me. I anticipated glaucoma but found tension normal, general health below par and excretion of urinary solids below normal. Marked ciliary and conjunctival irritation. Cornea soft and reflex very poor. Ophthalmometry showed O. D, 1 1/2 D. ax. against the rule and quite irregular O. D. V = 20/80 not imp. by g. O. S. V 20/80 not much improved by glasses. Diagnosis, keratoconus.

TREATMENT.

Diuretics followed by tonics; locally positive galvanism over palpebrum, and alum sulph. to cornea once a day.

April 26th, the conjunctival and ciliary congestion gone. Corneal curvature normal. O. D. V 20/40; 20/25 W. + .75. O. S. V 20/40; 20/25 W. + 1.00. Eyes quiet. Gave collyrium of four per cent. alum sulph.

Aug. 4th. Vision and refraction were same. The old asthenopia still remaining.

THE REAL PRINCIPLE OF TEST-TYPE CONSTRUCTION.*

By B. Alex. Randall, M. A., M, D., Ph. D.,

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The principle of test-type construction was laid down by Snellen in 1862, that roman capital letters, whose height subtends at the chosen distance an angle of 5′ and with lines and interspaces one-fifth of this height constitute a fair average test for visual accuity. These tests were based upon the

*Read at the Meeting of Amer. Acad. of Ophth. and Oto-Laryng., Aug. 26, 1904.

visual angle as defined by Scheiner in 1600. While, as shown by Booke in 1705, stars can be distinguished when some 30″ apart, and wires or rods under an angle of about 50″, (Helmholtz), the short member of the block-letter must have interspaces of 60″ to be clearly defined. This affords a retinal image of some .004 mm., and perception of form prob-

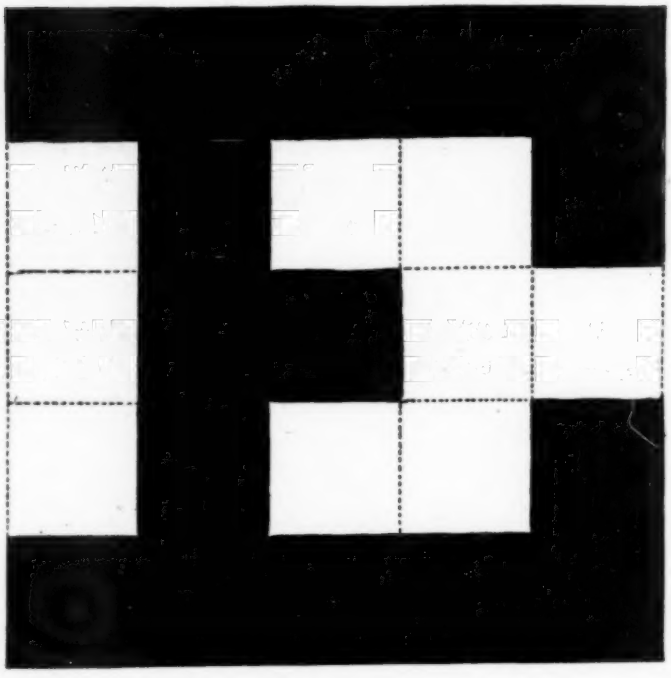


Fig. 1.

Green and Snellen's Test-Type.

ably depends upon excitation and nonexcitation of the adjacent cones of the macular region, with the size of which this closely corresponds. The sure recognition of an interspace seems to demand the presence of at least one unexcited cone between those affected. This standard, which holds fully for parallel lines or letters of like readiness of recognition, is fairly maintained as to strictly comparable figures, such as

the "haken" of Snellen; but it fails utterly when dots to the number of 5 or 6, separated by their own breadth, are to be distinguished. Experiment shows that the dots can be counted

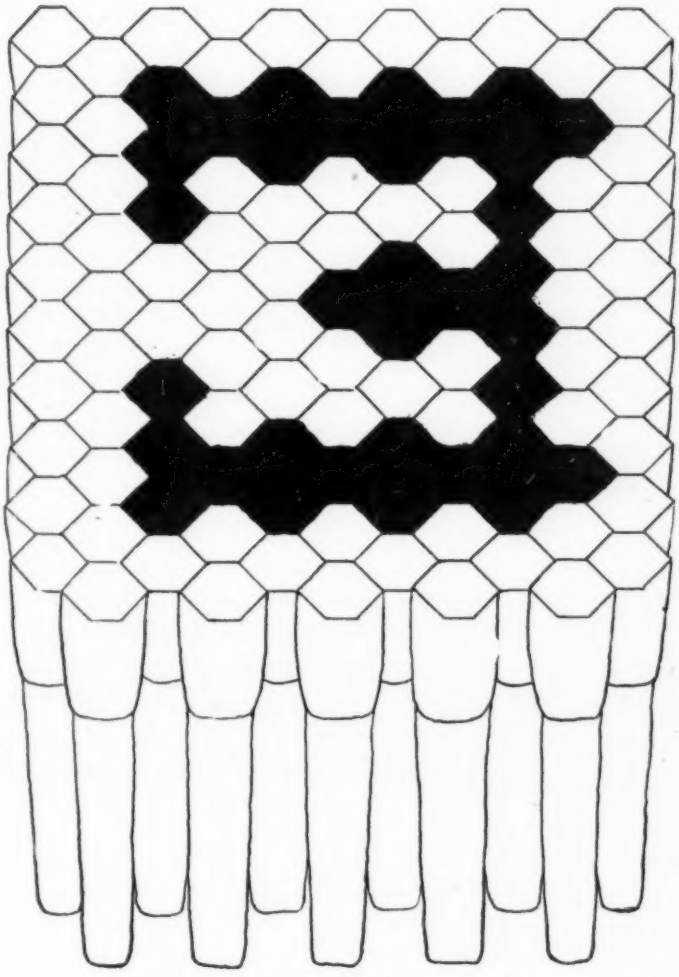


Fig. 2.
Retinal Image on the Macular Cones.

only when each subtends an angle of nearly 2 1/4", as set forth by Burchardt in his "Internationale-Sehproben," 1868, and by others who found that Snellen's dots on the scale of

his type for 50 feet were just fairly seen at 20 feet. Snellen, therefore, abandoned the dots rather than amend his principle, which even in his letter writings he terms the "5′ letter."

John Green improved the sequences of the distances for which he constructed letters, giving each the constant ratio of 0.795 to the next larger letters; but he used a simple Gothic letter with strokes subtending 1′ but with interspaces often three times as great. (Trans. Amer. Ophth. Soc., 1868). Hence his letters were too easily read; and Wallace later reduced them to 4′ height, making a fairer empirical card. Dennett used similar letters, but enlarged the difficult and diminished the easy from the 5′ size, thus giving letters of equal legibility but of wholly empirical basis.

Green in his edition of Carter (1878) gave us a new letter—a block roman capital of more conventional and reasonable form than Snellen's, in which the expanded feet and other adnexa of the letters were generally formed of half-minute blocks. Employing this type, Snellen's principle can be strictly applied and most of the alphabet can be inscribed in a 5′ square with 1′ lines and interspaces. The I and J are much too easy, the M and W rather too hard to discern, while others with circular or oblique lines are either easier or harder than the average, yet constitute valuable confusion tests.

Pleased with the more perfect exemplification of Snellen's principle afforded by these letters and recognizing more fully than any writer had set forth that the real principle was that *interspaces*, rather than lines should subtend an angle of 1′, I constructed in 1880 series of test-cards with Green's letter, and published such a card in 1885 and again in 1895. With Drs. Risley and Posey as a committee I prepared for the Public Education Association of Philadelphia a simple school card in 1902, economizing space by using but a single letter for the larger types. For nearly twenty-five years it has been so clear to me that the 1′ test is in letters the real test for visual acuity, that I have read such a view into the writings of Snellen and others, where it has been vaguely, if at all stated; and it is only latterly that I have felt the need of reiterating and enforcing this view by finding so many to be caricaturing or disregarding it. It may be known to all; but it certainly is not duly observed by many who have pub-

lished tests. Letters, or rather objects otherwise constructed, can have undouted value; but they must rest on more or less empirical basis, and if they are not block-letters they have no right to claim to fulfil Snellen's principle.

Let us construct our test-objects so that they shall furnish at the desired distances rational images averaging nearly the minimum visible as calculated from the size of the cones of the retinal macula; and use the principle of contrast which seems to demand one unaffected cone between two stimulated cones to insure clear recognition of all details of fairly complex objects, and we will be nearer to a true standard for measuring vision. The illumination under which the tests are to be viewed must also be standardised as by the use of artificial light of fair constancy; since with narrow pupils under open sky one should see nearly twice as sharpely as on the same card in the consultation room. The white letters upon a black ground as used by Seggel, Gould and others, have certain advantages; but the more usual black letter can be as well used if printed upon a surface distinctly creamy and free from such irradiation,

Snellen's first "Optotypi" were claimed to be based on the arc of 5′ at the required distances; but in his later papers (Norris and Oliver, Vol. II., p. 18) he makes the usual error of using the tangent of the angle. Thus the LX meter letter has a height of 87.25 mm. instead of 85.5 as when calculated on twice the tangent of half the angle and should be visible at 61.22 m. While this error is small, it is needless, and typifies countless other wilful misrepresentations of the principle embodied in the various "Snellen's Types", which have been published.

REMARKS CONCERNING SOME PARTS OF THE TECHNIQUE OF MULES' OPERATION, THE HANDLING OF THIERSCH GRAFTS, AND ADVANCEMENT OF THE RECTI MUSCLES.*

By John E. Weeks, M.D.

NEW YORK.

1. In performing the operation commonly known as Mules' operation, in which a ball made of glass, gold, silver, or other substance, is placed within the sclera, it is the experience of nearly all operators that the union between the margins of the sclera has given away sooner or later and that the enclosed ball has escaped. In order to make the union between the scleral margins perfectly secure, the writer has employed a suture which passes through the sclera as indicated at *a* in the accompanying diagram (Fig. 1), and which,

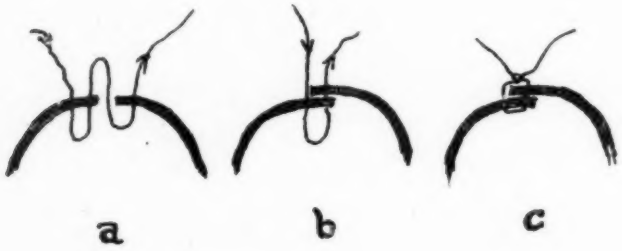


Fig. 1.

when tied, causes the margins of the sclera to overlap as at *b* and present the appearance as at *c*. Interrupted or continuous sutures may be employed. The writer uses chromatized catgut No. 1, which dissolves in from twelve to sixteen days. The union obtained is much more firm than can be obtained by end-to-end suturing. The conjunctiva is united over the sclera with silk sutures in the usual way.

*Read at the Meeting of Amer. Acad. of Ophth. and Oto-Laryng., Aug. 26, 1904.

2. The handling of Thiersch grafts in the ordinary way has undoubtedly given many operators not a little annoyance, because of the tendency to roll up and to become folded as soon as the flap is taken from the knife. The method employed by the writer has given him much satistaction, as it enables him to handle the flaps and to adjust them to the surface to be covered with the greatest ease and certainty. * The flap is cut from the selected surface with razor or special knife, flooding with normal salt solution in the ordinary manner. By the aid of the salt solution, the flap after it is detached is spread out as well as possible on the knife, the epithelial surface upward. A strip of sterile rubber tissue larger than the flap is now sparingly smeared on one side with sterile bichloride vaseline, 1-5000, and the smeared surface

Fig 2.

laid over the Thiersch flap and gently pressed upon it. The strip of rubber tissue, to which the flap adheres, is now lifted from the knife and the flap is spread out to its full extent. It is then cut while still on the rubber tissue to cover the area for which it is designed and applied to the raw surface, leaving the rubber tissue on the flap as a protective covering. The ordinary dressings are now applied. The rubber tissue may be removed after the lapse of four to six days.

3. In advancing a rectus muscle, the writer has found the following procedure to be satisfactory in technique and to give excellent results. Cocaine and adrenaline are employed whether a general anaesthetic is or is not used. With local anaesthesia the operation is devoid of pain of any moment. The instruments required are speculum, straight mouse-tooth forceps, medium size, fixation forceps, broad slotted forceps* (Fig. 2), strabismus hook, scissors (Stevens' strabismus

*These are strong fixation forceps with rather fine teeth. Each blade measures 6 mm. in width and is slotted. The slot runs from the edge of the blade upward 4 mm. and is 1.5 mm. wide to accommodate the closed blades of the mouse-tooth forceps. They are made by George Tiemann & Co., New York City.

scissors are very excellent), double-armed sutures of No. 3 or No. 5 silk, needle-holder.

At the beginning, the location of the horizontal meridian is marked in the conjunctiva at the margin of the cornea, corresponding to the side of the muscle to be advanced, by catching up the conjunctiva with the mouse-tooth forceps and nicking it with the scissors. This mark is of value as a guide in passing the central suture through the scleral tissue. The conjunctiva and subconjunctival tissue over the insertion of the tendon of the muscle to be advanced are now raised by means of the mouse-tooth forceps and are incised, the incision corresponding to the line of insertion of the tendon and extending a little beyond the insertion at either border. The tendon, now exposed, is seized at its middle with the mouse-tooth forceps and is snipped through. The detachment of the tendon is extended both ways from its center, leaving a stump of perhaps one-half millimeter attached to the globe, until an opening sufficiently large (six millimeters in length) to admit a blade of the slotted forceps is obtained. The mouse-tooth forceps are made to engage the middle of the tendon at its cut edge, the conjunctiva, and subconjunctival tissue, and these are held until the slotted forceps can be placed in position. One of the blades of the slotted forceps is slipped beneath the end of the tendon and the other blade is shut down on the engaged portion of the tendon, conjunctiva, and subconjunctival tissue, including one and a half to two millimeters of these tissues, the mouse-tooth forceps by which these tissues are held being accommodated in the slot. The mouse-tooth forceps are now removed, leaving the end of the tendon, conjunctiva, and subconjunctival tissue firmly engaged between the blades of the slotted forceps and thoroughly under the control of the operator. The detachment of the tendon is now completed.

Three double-armed silk sutures (No. 3 or No. 5) are employed, one of which, the middle one, may be white for purposes of identification. The needles that are passed through the tendon pass first from the under surface, including muscle, subconjunctival tissue, and conjunctiva. It is well known that the sutures, unless looped or tied over a few fibers of the tendon of the muscle, will pull through or cut

through the tendon to a greater or less degree, according to the tension, lessening the effect. The end of the suture that passes through the scleral and episcleral tissue does not cut through so easily. To prevent this cutting through and to avoid injury to the tendon by strangulation or cutting through a portion of the fibers, as may occur when a portion of the tendon is tied in the suture, the writer loops or "quilts" the middle suture in its passage through the tendon in all cases (see Fig. 3). In cases in which the traction is to be excessive, all three of the sutures are looped. This is done by

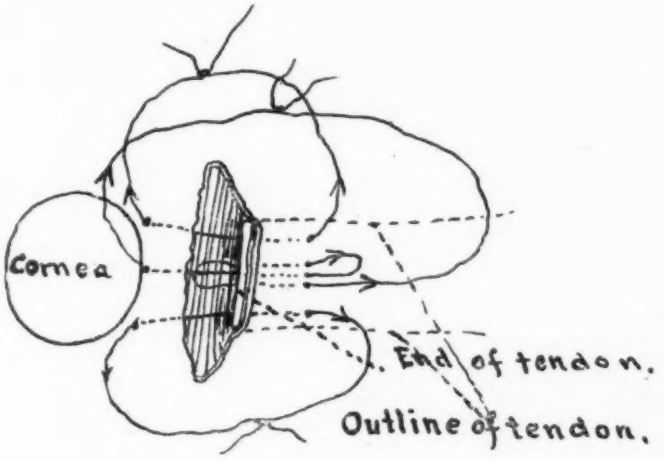


Fig. 3.

passing both of the needles of the middle suture through the tendon and superimposed tissues from the under surface, one millimeter on each side of the middle line of the tendon at the proper distance from the cut end of the tendon, and returning one of the needles through the middle line of the tendon from the conjunctival surface on the same plane with the first two. After the sutures are passed through the tendon, the desired shortening of the tendon is effected. The endeavor is made to include in the grasp of the slotted forceps only as much of the end of the tendon, conjunctiva, and subconjunctival tissue as it is desired to remove (one to two and a half millimeters). To effect the shortening, it is then necessary to cut away only what is grasped by the forceps. Care must be observed not

to cut the sutures when excising the end of the tendon, and the sutures must pierce the tendon sufficiently far back from the end of the tendon (four to six millimeters) to ensure a permanent hold. The sutures that engage the scleral tissue must now be passed. A short stump of the tendon, if left on the globe, will be found of much aid in affording counter-traction. The needle should pass beneath the conjunctiva, penetrate into the sclera, and include about one-half of the thickness of the sclera. The needle of the middle suture should emerge at the margin of the cornea exactly in the horizontal meridian of the cornea, and the lateral sutures should emerge tangent to this margin of the cornea five millimeters above and below the middle suture. The sutures are then firmly tied, drawing the end of the muscle toward the cornea as far as possible without cutting through tissue. The opposing muscle is or is not weakened, according to the judgment of the operator.

The sutures are removed after the expiration of eight or ten days. The writer sometimes bandages but one eye, but often bandages both eyes for from one to three days in order to prevent undue strain on the sutures by frequent movements of the eyes.

AN EXPERIENCE WITH STAINING THE SKIN BY ARGYROL.

By H. M. Post, M. D.

ST. LOUIS, MO.

April 6, '04, my assistant operated on a chalazion of the left upper eyelid, of one of my regular patients. After he had scraped out the cavity, being an enthusiast about argyrol, he injected argyrol 25 per cent. into the cavity.

The following day the patient returned with the upper lid very black and shining, not like an ordinary "black eye"; but like a highly polished stovelid. The eyelid was swollen, and the discoloration extended almost to the eyebrow. The

condition looked very serious, and I was not at all certain that it might not be permanent.

Knowing that iodide of potassium will remove nitrate of silver stains, I reopened the incision, and injected into it a solution of iodide of potassium gr i to ℥i.

April 8th, much to my satisfaction, the staining was less at the site of the chalazion, but a little way from it the discoloration was no better. The swelling of the lid was greater. I injected the cavity of the chalazion again with iodide of potassium solution, and in order to attack it *vi a tergo*, as well as *vi a fronte*, I prescribed internally iodide of sodium gr. v three times a day.

April 9th, staining still less at site of operation, swelling less. Increased iodide of sodium to gr. vii ss, and injected iodide of potassium again into chalazion sac. (Condition of physician much more hopeful.)

April 10th, treatment the same.

April 11th, appearance of the eyelid much better, stain has almost disappeared from it, and is now confined almost entirely to the skin between the upper portion of the lid and the eyebrow.

Increased the dose of the iodide of sodium to gr. x three times a day.

April 13th, one week after the injection of argyrol was given, the stain was almost gone. Eyelid was still very much swollen. Reopened incision and injected sulphate of zinc gr. i to ℥i. Continued the sodium iodide internally.

April 15th. Stain gone, swelling less. Stopped the iodide of sodium.

From this time the case made an uneventful recovery.

One of my colleagues informs me that he has had a discoloration from argyrol which has disappeared under no treatment. I have a case now coming to me where a discoloration was produced by frequent injections of the lacrimal sac with argyrol, given a number of months before the occurrence of the case reported above, and the discoloration remains unchanged. It is slight and I have not used the iodide of potassium injection.

The mixture of a solution of the iodide of potassium with a solution of argyrol, gradually produces a white precipitate,

and I can not but think that the injections had something to do with restoring the eyelid to its normal color, especially as the clearing of the discoloration began at the point where the solution of the iodide was injected, and where the discoloration was greatest.

NEW CLAMPS FOR FIXING THE EYELID IN SUB-SECTION OF THE TARSUS.

By Arthur E. Ewing, M.D.,

St. Louis, Mo., U. S. A.

While the modification of the *pince anneau* of Desmarres, which was described in an article on entropium of the lower

Fig. 1.

lid in the February number of this journal, 1903, serves its purpose very well as an aid for making the tarsal incision (the

subsection of Green) in this operation upon the lower lid, the broad spatular blade interferes with the placing of the stitches, and its value as a hemostatic is lost. It also does not work well in the same operation in the case of the upper lid.

To remedy these defects I have devised another instrument (manufactured for me by the Blees-Moore Instrument Co., in January, 1904), which is a clamp (figure 1) with blades two millimeters wide by one millimeter in thickness and as long as the eyelid, placed at right angles to the handle, and having a curve about the same as that of the free margin of the lower lid, with a short curve in the opposite direction at the distal end. This clamp works admirably both for the upper and the lower lid, but at the distal end it is weak. The handle is also heavier than is necessary for an object so delicate as an eyelid.

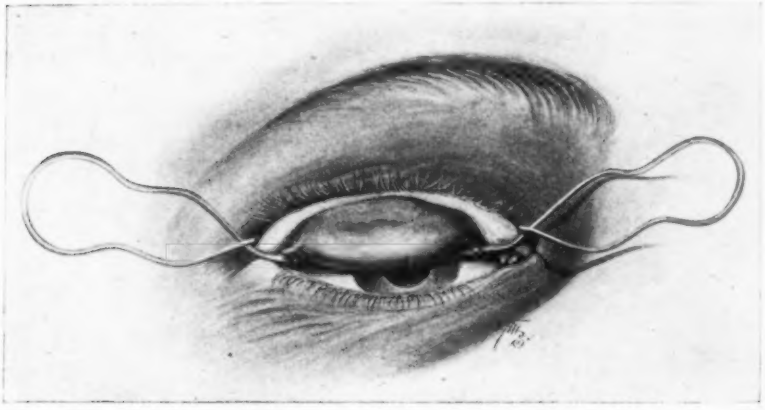


Fig. 2.

Recently I have constructed another instrument, which clamps evenly the whole length of the lid, and which is also very light. It is made of "piano," or steel spring wire one millimeter in diameter. The blades are similar in their form to those in the above-mentioned clamp, except that the one for the conjunctival surface is a continuation of the wire, while that for the dermal surface is of the thickness of the wire, but re-enforced so as to make it two and one-half or three millimeters in width. At either end of the blades the wire is crossed and continued in loops in such a way as to

form springs, and the springs are bent forward in order that the clamp may fit into the inner angle. On pressing the springs the blades are opened. By everting the upper lid this clamp is easily applied so as to include the whole or any part of the lid (Figure 2). The lightness of the instrument together with having its springs entirely out of the way of the operator make it ideal for its purpose when used on the upper lid, for which it was primarily designed. It does not work so well on the lower lid, the width of the loop interfering with the eversion.

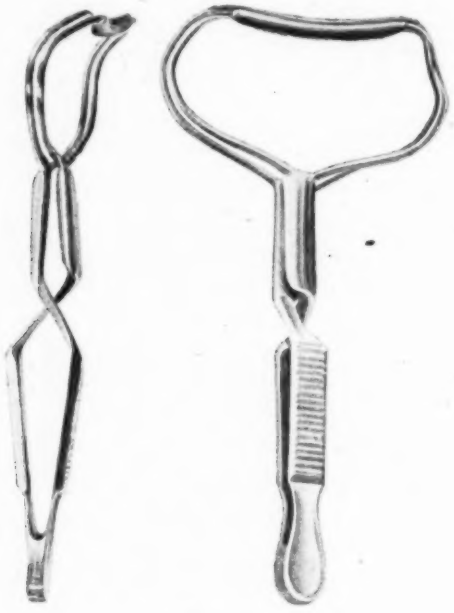


Fig. 3.

In order that similar forms for the blades might be used with the lower lid, the wires at either end of the biting portion of the blades were continued in an elliptical form, the one parallel with the other, and attached to the arms of a very light self-clamping forceps (a screw adjustment may be used if preferred) (Figure 3). To prevent the handle cumbering the operator the blades are bent about their long axes to an angle of one hundred and twenty degrees. With this instrument either the upper or the lower lid may be everted to any position desired, the lower lid by placing the broader blade

against the dermal surface of the lid just below the cilia, and making gentle pressure downward and backward until the necessary eversion is obtained, and then applying the thinner blade to the conjunctival surface. For its use on the upper lid, the lid should be everted as in the case of the wire spring mentioned above. By a little manipulation the broader blade may then be applied to the dermal surface, and the thinner to the conjunctival surface in such a way as to pass back of the tarsus, and fit snugly into the outer and inner angles so as to expose the whole tarsal portion of the lid. The wider blade upon the dermal surface gives sufficient resistance to aid in the incision through the tarsus from the punctum to the outer angle, and yet it is not so wide as to interfere with the placing of the sutures. The handle of the forceps rests upon the forehead: with the lower lid it rests upon the cheek.

In my experience with several cases since writing the article published in 1903, I have found it best to use a greater number of sutures through the lid than was recommended in that article, three to six in the lower lid, and five to eight in the upper lid, in order to securely fasten the conjunctival margin of the standing portion of the tarsus into the bottom of the wound. Also, better union will be obtained by not disturbing the lid very much for four or five days: proper cleansing may be effected by moderately raising the lid without completely everting it. Under favorable aseptic conditions the sutures may remain from five to seven days. To facilitate their removal, as well as to prevent them cutting through the skin, a large sterilized thread may be passed beneath them on the dermal surface before tying them, and allowed to remain until they are to be removed, when by lifting one end of this thread they may readily be divided one after the other. Collodion is not essential to the eversion, but I prefer it as a protective dressing, and usually apply it after twenty-four hours, when the circulation in the lid has become fully established.

For my drawings I am indebted to Dr. R. Walter Mills. For aid in perfecting the finish of the last two clamps I am under obligation to Mr. C. W. Alban, surgical instrument maker.

MEDICAL SOCIETIES.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

JOHN TWEEDY, F.R.C.S., President, in the Chair.

Thursday, January 26th, 1905.

MALIGNANT DISEASE OF CONJUNCTIVA.

Dr. Freeland Fergus, in a paper read in the absence of the author by Dr. F. R. Hill (Carlisle), related a case of malignant disease of the conjunctiva. The patient was a girl, aged 9, who was sent to him by Dr. Hill in November, 1903. On the lower part of the bulbar conjunctiva were some sprouting vegetations, with an appearance not unlike that seen in spring catarrh. The limbus and palpebral conjunctiva were unaffected. It had first been noted six months previously. The vision was 6/9, and a portion was removed for examination. The pathological report was indefinite. Shortly after the rest was removed, and the patient was sent back to Carlisle under Dr. Hill's care. The pathological reports of Professor Muir and Mr. Devereux Marshall showed the growth to be of an unusual character, but probably a sarcoma, but its appearance left no doubt as to its being malignant. On March 21st, owing to its rapid extension, the whole contents of the orbit were removed, and the patient was sent back on April 14th. On May 23d she was again seen, but the recurrence was so extensive that no operation was possible. The neighboring glands were also involved, and even at this time there were cerebral symptoms. The child died in October with the tumor of enormous size. The *post-mortem* examination showed extensive involvement of the brain. The growth was apparently a leucosarcoma.

Mr. Parsons, who had examined the growth, said it appeared to him to be one of those rare cases when some naevoid tissue takes on malignant growth, and he looked upon it as being probably an epithelial growth rather than a connective-tissue one.

QUININE IN THE TREATMENT OF CORNEAL ULCERS.

Mr. Arnold Lawson read a paper on the treatment of corneal ulcers by quinine. He said that up to the present time the use of quinine in ophthalmology had been restricted to a very limited class of conjunctival and corneal affections, but his observations, which had extended over four years, showed that it was a very powerful curative agent in a large variety of corneal ulcers not amenable to ordinary routine treatment, to which much more drastic measures were commonly applied. The sulphate of quinine dissolved carefully in just sufficient sulphuric acid to hold the salt in solution was preferable to either the hydrochloride or the acid sulphate, both of which were soluble in water; and it was recommended to be used in a 1 per cent. solution. The eyes should be soaked in the solution for five minutes four or five times a day, and in addition a thorough irrigation daily by an undine filled with the solution was advised. It caused very little discomfort, and patients used it readily, but stronger solutions gave rise to pain, and had no advantage. When the treatment was going to be successful, improvement showed itself within a few days, and if no manifest benefit was obtained within a week it might be discontinued. The rapidity of healing under this treatment was at times remarkable, and the author had seen many formidable-looking ulcers heal by this treatment alone within a week. A list of several cases of corneal ulceration treated by this method within the last three years was appended to the paper.

THE NOTATION OF PRISMS.

Mr. Claude Worth read a paper on the notation of prisms. He said that when one ordered a spherical or cylindrical lens, one did not concern oneself with the refractive index of the glass of which it was made. One specified that it should

have a certain definite effect upon a pencil of light, and bring it to a focus at a certain specified distance. But prisms were numbered by most opticians according to the geometrical angle, so that if one wanted a prism which should deflect a pencil of light say 4 degrees, one had to order a prism of 8 degrees geometrical angle. The optician then supplied a prism whose actual deflecting power was somewhere between 3 degrees and 5 degrees, according to the kind of glass of which it was made. It was much more convenient and accurate to number a prism according to the number of degrees which it deflected a pencil of light. Although this matter had been described before, yet he brought it forward in the hope that the Society would make some definite pronouncement which would be accepted by spectacle makers in this country; much inconvenience would thus be avoided.

DETACHMENT OF RETINA.

Dr. D. J. Wood (Capetown), after referring to a case of detachment of the retina recorded by him in vol. xii of the *Transactions*, described another case which he had recently seen which bore a strong likeness to the previous one. The patient was a bucolic Dutchman, aged 35, whose right eye had been lost five years before from perforating ulcer, and the eye had been removed. Since that time, the sight of the left had been failing, but had rapidly deteriorated during the last five weeks. His vision was P. L., and he could just see large objects moving below. The pupil was active, and the tension was normal. The ophthalmoscope showed two rounded detachments meeting and widening out above. The vitreous was clear, and one could just see below the disc, but the striking feature was the swelling and tortuosity of the vessels, which at once recalled the former case to mind. The vessels were more than double their natural size, and were tortuous to a degree. Both arteries were constricted at frequent intervals, so that the arteries looked like beads, while the veins had the appearance of strings of sausages. The constricting bands were retinal in origin, and looked as if they were stitches holding the vessels down. In both cases it was difficult to follow the vessels, not only on account of the tor-

tuosity, but also because the color of the arteries and veins was so similar. There were no recent hæmorrhages, but some patches that were seen probably represented old ones. The question was whether it was a proliferation of inflammatory material in the retina or a primary disease of the vessels. Probably serous exudation caused detachment of the retina, but it was difficult to account for the lightness of color of the veins which was seen in both cases.

Mr. Louis Werner showed a sketch of a case of neuro-retinitis of a severe type which occurred in one eye of an anæmic girl, aged 24. There was neither headache nor vomiting, the only symptom being a feeling of lassitude and, for a time, excessive thirst. There was no albumen present, but the sugar reaction was doubtful. The left eye failed suddenly one morning, and the vision was reduced to hand movement. The field of vision was geatly contracted, but the color perception was good. The upper part of the disc was greatly swollen, with large corkscrew-like vessels spreading out from it, while the lower part was white and atrophic but indistinct. In less than three days a perfect star of white lines appeared at the macula. Under iron the swelling disappeared in three months and the vision improved to 6/36. The author referred to a case reported by Gowers, in which retinal changes resembling those of albuminuric retinitis occurred in a chlorotic patient.

EXHIBITS.

Dr. L. Cole-Baker showed a needle holder for use with either straight or curved needles, and a modification of Clark's eye speculum.—Mr. Bishop Harman showed a case in which there was congenital absence of the internal and external rectus muscles.—Mr. Secker Walker showed a radiograph of a case of gunshot wound in which two shots had entered the eye at the same hole and had lodged at the back of the orbit.—Mr. Paton showed a case of neuro-retinitis.

THE DOMINANT OR PREVAILING EYE.

To the Editor of American Journal of Ophthalmology:—

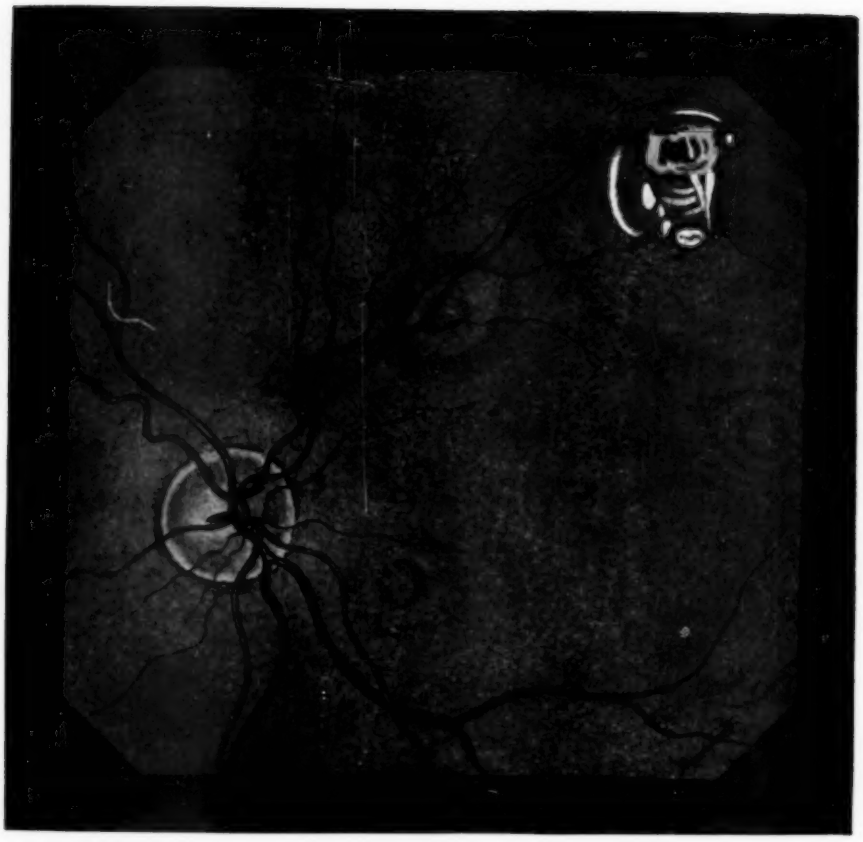
In the *Trans. Amer. Oph. Soc.* for 1904 just issued, there appears a paper by Dr. Geo. M. Gould, on "the pathologic results of dextro-ocularity and sinistro-ocularity," with an interesting discussion thereon.

Among other points raised was the question as to who first noted the existence of the "dominant eye," Dr. Gould claiming that it was original with him so far as his research into the literature enabled him to judge, and he requested that any earlier reference to the matter be made known.

I remembered that during my student days I had, while making some physiological investigations on a cognate subject, read a paper somewhere bearing directly on the very point under discussion, and finally it came to my mind that it was in an early number of *Knapp's Archives*. Turning back to the early volumes I found in the very first number, 1869, p. 186, an article on "The Theory of Binocular Vision," by H. Kaiser. The second division of his paper is on "The Prevailing Eye," in which he shows, exactly as Dr. Gould has done, by experimentation, that the right eye is the "prevailing eye" used in "sighting" by a right handed person, and the left is the prevailing eye in the left handed, though this latter is "not to be admitted without circumspection." This resurrection, while not in the least reflecting upon the independent originality of Dr. Gould, shows that it is yet true that *vixere fortes ante Agamemnona*.

Swan M. Burnett.

Washington, D. C., Jan. 19, 1905.



Foreign Body in the vitreous, which has become loosened from its position on the retina and is suspended by a connective tissue band in the vitreous.

Fig. 16.